IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Kleider et al.	)
		)
For:	Method of Multiple Carrier Communication within a Non-Contiguous Wideband Spectrum and Apparatus Therefor	)))))
Serial No.:	09/690,993	))
Filed:	October 17, 2000	))
Examiner:	Wang, T.	))
Art Unit:	2634	)

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Attention: Board of Patent Appeals and Interferences

APPELLANTS' BRIEF (Amended)

in response to Notification of Non-Compliant Appeal Brief

This brief is in furtherance of the NOTICE OF APPEAL, mailed on April 12, 2007, and the Notice of Non-Compliance, mailed October 9, 2007.

Any fees required under § 1.17, and any required petition for extension of time for filing this brief and fees therefor, are dealt with in the accompanying TRANSMITTAL OF APPEAL BRIEF.

This brief contains these items under the following headings, and in the order set forth below (37 C.F.R. § 41.37(c)):

I REAL PARTY IN INTEREST

II RELATED APPEALS AND INTERFERENCES

I. REAL PARTY IN INTEREST

The real party in interest in this appeal is Motorola, Inc., a Delaware corporation.

II. RELATED APPEALS AND INTERFERENCES

With respect to other appeals or interferences that will directly affect, or be directly affected by, or have a bearing on the Board's decision in this appeal, there are no such appeals or interferences.

III. STATUS OF CLAIMS

A. Status of all claims in the proceeding

1. Clams rejected: 12 and 13
2. Claims allowed: 1, 3-11, 22, 24-30
3. Claims withdrawn from consideration but not canceled: none
4. Claims objected to: 14-21
5. Claims canceled: 2 and 23

B. Identification of claims being appealed

The claims on appeal are: 12 and 13

IV. STATUS OF ANY AMENDMENTS AFTER FINAL

No amendments have been filed after the most recent Office Action made final, dated January 12, 2007.

V. SUMMARY OF CLAIMED SUBJECT MATTER

A first aspect of the present invention (claim 12), which is being appealed, pertains to a method of orthogonal frequency-division multiplex (OFDM) communication via a plurality of subchannels (30) within a noncontiguous wideband channel. The method includes producing (46; page 6, lines 7-8; page 18, line 29 to page 19, line 2) a modulation profile of said wideband channel, wherein said modulation profile is responsive to a signal-to-noise ratio (SNR) for each subchannel in said plurality of subchannels within said wideband channel. OFDM data is then transmitted (48, 198; page 19, lines 33-34) in response to said modulation profile, where said transmitting activity transmits said OFDM data over the plurality of subchannels, from which more than one user channel is formed (page 21, lines 4-5) and concurrently supported.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

1. Whether claims 12 and 13 have been improperly rejected under 35 U.S.C. 103(a) as being unpatentable over Polley et al. (US Patent No. 6,363,109) in view of Yamano et al. (US Patent No. 6,445,731).

VII. ARGUMENT

A. Rejections under 35 U.S.C. §103

1. Whether claims 12 and 13 have been improperly rejected under 35 U.S.C. 103(a) as being unpatentable over Polley et al. (US Patent No. 6,363,109) in view of Yamano et al. (US Patent No. 6,445,731).

Claims 12 and 13

The Examiner has rejected claims 12 and 13 under 35 USC §103(a) as being unpatentable over Polly et al., US Patent No. 6,363,109, in view of Yamano et al., US Patent No. 6,445,731. However contrary to the Examiner's assertions, the cited references being relied upon by the Examiner fail to make known or obvious each and every feature of the claims. More specifically, contrary to the assertions of the Examiner, the various combinations of references, fails to teach or suggest "wherein said transmitting activity transmits said OFDM data over the plurality of subchannels, from which <u>more than one user channel is formed</u> and <u>concurrently supported</u>" (claim 12).

In attempting to suggest, that the same is known or obvious by the combination of cited references, the Examiner acknowledges that Polly et al., '109, minimally fails to teach or suggest more than one user channel. However, contrary to the Examiner's assertions, Yamano et al., '731, fails to account for the acknowledged deficiency. In suggesting that Yamano et al., '731, makes known or obvious the same, the Examiner refers to FIG. 7; col. 5, lines 12-25; and col. 19, lines 1-15. The portion of the specification corresponding to col. 5, lines 12-25 relates to the multiplexing of multiple transmitters to a limited number of receiver circuits, while the portion of the specification corresponding to FIG. 7, and col. 19, lines 1-15, correspond to a multi-drop operation. However, neither of these two examples make known or obvious the corresponding claimed feature, where more than one user channel is formed from the plurality of subchannels and are concurrently supported.

With regards to the portion of the specification corresponding to col. 5, lines 12-25; there is no <u>concurrent</u> support of more than one user channel. In fact each remote transmitter circuit is expressly identified as being coupled to separate telephone lines (col. 5, lines 13-14), where they are separately multiplexed and correspondingly coupled to any particular receiver circuits (see col.5, lines 16-18 and col. 5, lines 32-33). In essence, each transmitter is received at a switch, which selectively couples the transmitter circuit to a receiver circuit. In other words, there is a single communication path/channel that is used by each one of multiple transmitter circuits, as opposed to the concurrent support for the more than one user channels provided in the claim.

With regards to the multi-drop example cited by the Examiner, the reference similarly fails to provide for the claimed concurrent support, such that the reference fails to make known

more than a single (i.e. same) communication (user) channel, which is then used by multiple modems, individually, separately taking turns. In the case of the multi-drop embodiment, the reference provides for an arbitration "such that <u>only one</u> modem is transmitting analog signal bursts to the telephone line <u>at any given time</u>" (see col. 5, lines 42-45). In essence, the reference teaches away from the formation and concurrent support of more than one user channels, and therefore fails to make known or obvious each and every feature of the claims.

Because the combination of references being relied upon fail to make known each and every feature of the claims, either alone, or taken together, than the rejection falls short of meeting the minimal requirements for such a rejection. As such, the rejection should be withdrawn as being improper. The above noted distinctions is similarly applicable to claim 13, which depend from independent claim 12.

The applicants would respectfully request that the Examiner's decision to finally reject the presently pending claims, and any objection of claims premised upon the rejection of claims 12 and 13 be overturned, and that the claims be permitted to proceed to allowance.

Respectfully submitted,

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VIII. APPENDIX OF CLAIMS

The following is the text of the claims involved in this appeal:

1. A method of orthogonal frequency-division multiplex (OFDM) communication via a plurality of subchannels within a noncontiguous wideband channel, said method comprising:

receiving a reference signal transmitted over each subchannel in said plurality of subchannels within said wideband channel;

producing a modulation profile of said wideband channel, wherein said modulation profile is responsive to a signal-to-noise ratio (SNR) for each subchannel in said plurality of subchannels within said wideband channel, wherein said producing activity comprises

establishing a least-SNR requirement,

determining said SNR for each of said subchannels in said plurality of subchannels within said wideband channel, and

designating each of said subchannels having an SNR greater than said least-SNR requirement as a clear subchannel; and

transmitting OFDM data in response to said modulation profile.

2. (canceled)

3. An OFDM communication method as claimed in claim 1 wherein said producing activity additionally comprises:

establishing a least-quality-of-service requirement; and

optimizing a throughput of each of said clear subchannels in which a quality-of-service is greater than said least-quality-of-service requirement.

4. An OFDM communication method as claimed in claim 1 wherein said producing activity additionally comprises:

establishing a least-throughput requirement; and

optimizing a quality-of-service of each of said clear subchannels in which a throughput is greater than said least-throughput requirement.

5. A method of orthogonal frequency-division multiplex (OFDM) communication via a plurality of subchannels within a noncontiguous wideband channel, said method comprising:

producing a modulation profile of said wideband channel, wherein said modulation profile is responsive to a signal-to-noise ratio (SNR) for each subchannel in said plurality of subchannels within said wideband channel including

establishing a least-SNR requirement,

determining said SNR for each of said subchannels in said plurality of subchannels within said wideband channel,

designating each of said subchannels having an SNR greater than said least-SNR requirement as a clear subchannel,

sorting said subchannels by said SNRs therein,

adjusting said least-SNR requirement,

determining said SNR for each of said subchannels in said plurality of subchannels within said wideband channel, and

designating each of said subchannels having an SNR greater than said adjusted least-SNR requirement as an impeded subchannel; and

transmitting OFDM data in response to said modulation profile.

6. An OFDM communication method as claimed in claim 5 wherein said producing activity additionally comprises:

determining a noise level for each of said clear and impeded subchannels; and

determining an OFDM data-signal level for each of said clear and impeded subchannels, wherein a subchannel energy level is substantially equal to said OFDM data-signal level for each of said clear subchannels, and said subchannel energy level is substantially equal to a sum of said OFDM data-signal level plus said noise level for each of said impeded subchannels.

7. An OFDM communication method as claimed in claim 1 additionally comprising iterating said producing and transmitting activities to track changes in said SNR in each subchannel of said plurality of subchannels within said wideband channel.

8. An OFDM communication method as claimed in claim 1 wherein said producing activity comprises:

scanning said wideband channel; and

determining said SNR for each of said subchannels in said plurality of subchannels within said wideband channel in response to said scanning activity.

9. A method of orthogonal frequency-division multiplex (OFDM) communication via a plurality of subchannels within a noncontiguous wideband channel, said method comprising:

producing a modulation profile of said wideband channel, wherein said modulation profile is responsive to a signal-to-noise ratio (SNR) for each subchannel in said plurality of subchannels within said wideband channel including

scanning said wideband channel, and

determining said SNR for each of said subchannels in said plurality of subchannels within said wideband channel in response to said scanning activity, comprising ascertaining usable ones of said subchannels in response to said SNR of each of said subchannels, and estimating a bit error rate for each of said usable subchannels; and

transmitting OFDM data in response to said modulation profile.

10. An OFDM communication method as claimed in claim 9 wherein said transmitting activity transmits said OFDM data signal in response to said bit error rate of each of said usable subchannels.

11. A method of orthogonal frequency-division multiplex (OFDM) communication via a plurality of subchannels within a noncontiguous wideband channel, said method

comprising:

producing a modulation profile of said wideband channel, wherein said modulation profile is responsive to a signal-to-noise ratio (SNR) for each subchannel in said plurality of subchannels within said wideband channel including

scanning said wideband channel, and

determining said SNR for each of said subchannels in said plurality of subchannels within said wideband channel in response to said scanning activity, comprising ascertaining usable ones of said subchannels in response to said SNR of each of said subchannels, and estimating a throughput for each of said usable subchannels; and

transmitting OFDM data in response to said modulation profile.

12. A method of orthogonal frequency-division multiplex (OFDM) communication via a plurality of subchannels within a noncontiguous wideband channel, said method comprising:

producing a modulation profile of said wideband channel, wherein said modulation profile is responsive to a signal-to-noise ratio (SNR) for each subchannel in said plurality of subchannels within said wideband channel; and

transmitting OFDM data in response to said modulation profile; and

wherein said transmitting activity transmits said OFDM data over the plurality of subchannels, from which more than one user channel is formed and concurrently supported.

13. An OFDM communication method as claimed in claim 12 wherein each of said

user channels comprises at least one of said subchannels.

14. An OFDM communication method as claimed in claim 13 wherein:

said producing activity additionally comprises designating each of said subchannels having said SNR less than said least-SNR threshold and greater than an SNR-evaluation threshold as an impeded subchannel; and

said transmitting activity transmits said OFDM data so that each of said impeded subchannels receives said OFDM data at said intermediate subchannel signal level.

15. An OFDM communication method as claimed in claim 14 wherein:

said producing activity comprises determining a signal-to-noise ratio (SNR) for each of said subchannels in said plurality of subchannels within said wideband channel;

said producing activity additionally comprises designating each of said subchannels having said SNR greater than a least-SNR requirement as clear subchannel; and

said transmitting activity transmits said OFDM data so that each of said clear subchannels receives said OFDM data at said maximum subchannel signal level.

16. An OFDM communication method as claimed in claim 15 wherein, said least-SNR requirement is a first least-SNR requirement, and wherein:

said producing activity additionally comprises adjusting said least-SNR requirement to produce a second least-SNR requirement;

said producing activity additionally comprises designating each of said subchannels

having said SNR less than said first least-SNR requirement and greater than said second least-SNR requirement as an impeded subchannel; and

said transmitting activity transmits said OFDM data so that each of said impeded subchannels receives said OFDM data at said intermediate subchannel signal level.

17. An OFDM communication method as claimed in claim 16 wherein:

said producing activity additionally comprises designating each of said subchannels not designated as one of said clear subchannel and said impeded subchannel as an obstructed subchannel; and

said transmitting activity transmits said OFDM data so that each of said obstructed subchannels receives said OFDM data at said zero subchannel signal level.

18. An OFDM communication method as claimed in claim 14 wherein said producing activity comprises:

determining a signal-to-noise ratio (SNR) for each of said subchannels in said plurality of subchannels within said wideband channel;

designating each of said subchannels having said SNR greater than a first least-SNR requirement as a clear subchannel;

designating each of said subchannels having said SNR less than said first least-SNR requirement and greater than a second least-SNR requirement as an impeded subchannel;

determining a noise level in response to said SNR for each of said clear and impeded subchannels; and

deducing an OFDM data-signal level for each of said clear and impeded subchannels, wherein a subchannel signal level is a sum of said OFDM data-signal level plus said noise level for each of said clear and impeded subchannels, and wherein said subchannel signal levels for each of said clear and impeded subchannels are substantially equal.

19. An OFDM communication method as claimed in claim 18 wherein said producing activity additionally comprises:

establishing a least-quality-of-service requirement for each of said clear and impeded subchannels; and

optimizing a throughput of each of said clear and impeded subchannels in which a quality-of-service is greater than said least-quality-of-service requirement.

20. An OFDM communication method as claimed in claim 18 wherein said producing activity additionally comprises:

establishing a least-throughput requirement for each of said clear and impeded subchannels; and

optimizing a quality-of-service of each of said clear and impeded subchannels in which a throughput is greater than said least-throughput requirement.

21. An OFDM communication method as claimed in claim 14 additionally comprising iterating said producing and transmitting activities.

22. An orthogonal frequency-division multiplex (OFDM) communication system utilizing a plurality of subchannels within a noncontiguous wideband channel, said system comprising:

an OFDM receiver configured to obtain a signal-to-noise ratio (SNR) for each subchannel in said plurality of subchannels within said wideband channel, wherein said OFDM receiver comprises

a scanning section configured to scan each of said subchannels in said plurality of subchannels within said wideband channel,

a detection section coupled to said scanning section and configured to obtain said SNR for each of said subchannels, and

an evaluation section coupled to said detection section and configured to designate as a clear subchannel each of said subchannels having a SNR greater than a least-SNR requirement; and

an OFDM transmitter in communication with said OFDM receiver and configured to transmit OFDM data so that said OFDM receiver receives said OFDM data in each subchannel within said plurality of subchannels within said wideband channel at one of a zero subchannel signal level, a predefined maximum subchannel signal level which is greater than the zero subchannel signal level, and a predefined intermediate subchannel signal level which is greater than the zero subchannel signal level and less than the maximum subchannel signal level, in response to said SNR therein.

23. (canceled)

24. An OFDM communication system as claimed in claim 22 wherein said OFDM transmitter is configured to transmit said OFDM data so that said OFDM receiver receives said OFDM data in each of said clear subchannels at said maximum subchannel signal level.

25. An OFDM communication system as claimed in claim 22 wherein:

said least-SNR requirement is a first least-SNR requirement;

said evaluation section is additionally configured to designate as an impeded subchannel each of said subchannels having a SNR less than said first least-SNR threshold and greater than a second least-SNR requirement.

26. An OFDM communication system as claimed in claim 25 wherein said OFDM transmitter is configured to transmit said OFDM data so that said OFDM receiver receives said OFDM data in each of said impeded subchannels at said intermediate subchannel signal level.

27. An OFDM communication system as claimed in claim 26 wherein:

said intermediate subchannel signal level is one of a plurality of intermediate subchannel signal levels; and

said OFDM transmitter is configured to transmit said OFDM data so that said OFDM receiver receives said OFDM data in each of said impeded subchannels at one of said plurality of intermediate subchannel signal level s in response to said SNR thereof.

28. An OFDM communication system as claimed in claim 25 wherein said evaluation section is additionally configured to designate as an obstructed subchannel each of said subchannels not designated as one of said clear subchannels and said impeded subchannels.

29. An OFDM communication system as claimed in claim 28 wherein said OFDM transmitter is configured to transmit said OFDM data so that said OFDM receiver receives said OFDM data in each of said obstructed subchannels at said zero subchannel signal level.

30. A method of orthogonal frequency-division multiplex (OFDM) communication via a plurality of subchannels within a noncontiguous wideband channel, said method comprising:

determining a signal-to-noise ratio (SNR) for each of said subchannels in said plurality of subchannels within said wideband channel;

designating as a clear subchannel each of said subchannels in which said SNR is greater than or equal to a first least-SNR requirement;

designating as an impeded subchannel each of said subchannels in which said SNR is less than said first least-SNR threshold and greater than or equal to a second least-SNR requirement;

designating as an obstructed subchannel each of said subchannels not designated as one of said clear subchannels and said impeded subchannels; and

transmitting OFDM data so that each of said clear subchannels receives said OFDM data at a maximum subchannel signal level, each of said impeded subchannels receives said OFDM

data at an intermediate subchannel signal level, and each of said obstructed subchannels receives said OFDM data at zero subchannel signal level.

IX EVIDENCE APPENDIX

None

X RELATED PROCEEDINGS APPENDIX

None